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## (54) Television receiver

Fernsehempfänger

Récepteur de télévision

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(56) References cited:  
EP-A- 0 178 844 GB-A- 2 166 028  
US-A- 4 901 147(73) Proprietor: MATSUSHITA ELECTRIC INDUSTRIAL  
CO., LTD.  
Kadoma-shi, Osaka-fu, 571 (JP)• IEEE TRANSACTIONS ON CONSUMER  
ELECTRONICS vol. 34, no. 3, August 1988, NEW  
YORK US pages 807 - 812 J.SAITOH ET AL 'A  
NEW TV RECEIVER'

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**Description****BACKGROUND OF THE INVENTION****Field of the Invention**

This invention relates to a television receiver.

**Description of the Prior Art**

Recently, television receivers with various additional functions have been developed. A final stage of the production of such multi-function television receivers requires many steps for adjustment and check. It is good to reduce the number of these steps for an efficient production of multi-function television receivers.

Document "A New TV Receiver" by J. Saitoh, et al., I.E.E.E. Transactions on Consumer Electronics, volume 34, No. 3, August 19, 1988, pages 807-812 discloses a TV chassis which uses a digitally controlled bus. For the described chassis, a number of LSIs are used so as to make the new TV receiver be easily aligned on the production line by a computer via the inter-IC bus and to allow for easy field servicing. By using digital bus, the productivity and product quality is to be increased so as to lower production costs.

**SUMMARY OF THE INVENTION**

It is an object of the present invention to provide a television receiver which can be produced efficiently, particularly to provide a television receiver which can be produced more economical than previously known designs.

This object is achieved by a television receiver comprising the features of the independent claims 1 and 3.

Preferred embodiments are described in the dependent claims.

**BRIEF DESCRIPTION OF THE DRAWINGS**

Fig. 1 is a block diagram of a television receiver according to a first embodiment of this invention.

Fig. 2 is a block diagram of a television receiver according to a second embodiment of this invention.

Fig. 3 is a flowchart of a program operating the microcomputer of Fig. 2.

Fig. 4 is a time-domain diagram showing a sequence of steps in the production of a television receiver.

Fig. 5 is a time-domain diagram showing a sequence of steps in the production of a television receiver and modes of operation of the television receiver.

Fig. 6 is a diagram showing a television receiver and steps in the production of the television receiver.

**DESCRIPTION OF THE FIRST PREFERRED EMBODIMENT**

With reference to Fig. 1, a television receiver includes a microcomputer 1, a factory check mode switch 2, an input device 3, an on-screen device 4, a usual television receiving circuit 5, and a cathode-ray tube (CRT) 6.

The microcomputer 1 is connected to the factory check mode switch 2, the input device 3, the on-screen device 4, and the television receiving circuit 5. The on-screen device 4 is connected to the CRT 6. Also, the television receiving circuit 5 is connected to the CRT 6.

The input device 3 includes a remote-control input device and an input keyboard. Various instruction signals can be inputted into the microcomputer 1 by operating the input device 3. The microcomputer 1 can output image information to the on-screen device 4. The on-screen device 4 generates an RGB video signal in response to the received image information and feeds the RGB video signal to the CRT 6 so that the image information can be visualized on the CRT 6.

The microcomputer 1 includes a combination of a CPU, a RAM, a ROM, and an I/O port. The microcomputer 1 operates in accordance with a program stored in the ROM. The program is designed so that the microcomputer 1 can execute processes indicated later.

The factory check mode switch 2 is of the manually-operated type, being changeable between an on position and an off position. The microcomputer 1 always monitors the position of the factory check mode switch 2. When the microcomputer 1 detects that the factory check mode switch 2 assumes the on position, the microcomputer 1 sets a quick mode of operation of the television receiver in which electronic control volumes such as a sound control volume and a brightness control volume can be varied at higher speeds than normal. The higher variation speeds enable faster check and adjustment of the television receiver.

During check and adjustment stages of the production of the television receiver in a factory, the factory check mode switch 2 is changed to the on state so that the microcomputer 1 sets the television receiver into the quick mode of operation. During the quick mode of operation, when an instruction signal for brightness adjustment is inputted into the microcomputer 1 via the input device 3, the microcomputer 1 generates brightness control signals and brightness test signals and feeds the brightness control signals and the brightness test signals to the television receiving circuit 5. As a result, brightness check and brightness adjustment of the television receiving circuit 5 are enabled. When an instruction signal for self-diagnosis is inputted into the microcomputer 1 via the input device 3, the microcomputer 1 checks various adjustment sections of the television receiving circuit 5 and generates image information representative of the results of the check. The microcomputer 1 outputs the image information to the on-screen

device 4. The on-screen device 4 generates an RGB video signal in response to the received image information and feeds the RGB video signal to the CRT 6, so that the results of the check are visualized on the CRT 6. When the check and adjustment stages of the production of the television receiver are completed, the factory check mode switch 2 is changed to the off state. Then, the factory check mode switch 2 may be removed from the television receiver.

#### DESCRIPTION OF THE SECOND PREFERRED EMBODIMENT

With reference to Fig. 2, a television receiver includes a usual television receiving circuit 11, an input device 12, a microcomputer main section 13, a RAM 14, a nonvolatile memory 15, an on-screen device 16, and a cathode-ray tube (CRT) 17.

The microcomputer main section 13 includes a CPU, a ROM, and an I/O port. The microcomputer main section 13, the RAM 14, and a nonvolatile memory 15 are connected to compose a microcomputer. The microcomputer main section 13 is also connected to the television receiving circuit 11, the input device 12, and the on-screen device 16. The on-screen device 16 is connected to the CRT 17. Also, the television receiving circuit 11 is connected to the CRT 17.

The input device 12 includes a keyboard 121 and a pair of a remote-control transmitter 122 and a remote-control receiver 123. Various instruction signals can be inputted into the microcomputer main section 13 by operating the input device 12. The nonvolatile memory 15 stores 1-bit data for representing either a factory mode or a normal mode. The 1-bit mode data is initially set so as to represent the factory mode. In addition, the nonvolatile memory 15 stores various information data and reference data which are changed in response to a change between the factory mode and the normal mode. The various information data and the reference data are initially set so as to correspond to the factory mode. The microcomputer main section 13 can output image information to the on-screen device 16. The on-screen device 16 generates an RGB video signal in response to the received image information and feeds the RGB video signal to the CRT 17 so that the image information can be visualized on the CRT 17.

The microcomputer main section 13 operates in accordance with a program stored in the internal ROM. When a power supply switch (not shown) leading to the microcomputer is changed to an on position, the microcomputer is reset and then the microcomputer starts to execute the program. Fig. 3 is a flowchart of the program.

As shown in Fig. 3, a first step 31 of the program reads out the 1-bit mode data, the various information data, and the reference data from the nonvolatile memory 15, and stores all the readout data into the RAM 14.

A step 32 following the step 31 decides whether or

not the 1-bit mode data represents a factory mode. When the 1-bit mode data represents a factory mode, the program advances to a step 33. Otherwise, the program jumps to a step 34.

5 The step 33 changes a main power supply relay switch (not shown) of the television receiver to an on position, so that all the sections of the television receiver are activated. In addition, the step 33 controls the on-screen device 16 so that a reference image will be indicated on the CRT 17 and that the CRT 17 and other sections of the television receiver will be set into an ageing state (an ageing mode of operation). After the step 33, the program advances to the step 34.

10 The step 34 decides whether or not an instruction signal for adjustment and check is inputted from the input device 12. When an instruction signal for adjustment and check is inputted from the input device 12, the program advances to a step 35. Otherwise, the program advances to a step 36 which continues the current mode of operation. After the step 36, the program returns to the step 34. Thus, the steps 34 and 36 are reiterated until an instruction signal for adjustment and check is inputted.

15 The step 35 decides whether or not the CRT 17 and other sections of the television receiver are in the ageing mode of operation. When the CRT 17 and other sections of the television receiver are in the ageing mode of operation, the program advances to a step 37. Otherwise, the program jumps to a step 38.

20 The step 37 controls the on-screen device 16 so that the operation of the CRT 17 will be changed from the ageing mode to a factory mode. In addition, the step 37 changes the operation of the television receiving circuit 11 into a factory mode. While the CRT 17 and other sections of the television receiver are in the factory mode, higher control speeds can be attained and special processes of checking and adjusting the television receiver can be executed. After the step 37, the program advances to the step 38.

25 The step 38 decides whether or not the 1-bit mode data represents the factory mode. When the 1-bit mode data represents the factory mode, the program advances to a step 39. Otherwise, the program advances to a step 40, which controls the on-screen device 16 and the television receiving circuit 11 so that the CRT 17 and other sections of the television receiver will be set into a normal mode of operation. After the step 40, the program returns to the step 34.

30 The step 39 decides whether or not an instruction signal for shipment setting is inputted from the input device 12. When an instruction signal for shipment setting is inputted from the input device 12, the program advances to a step 41. Otherwise, the program advances to a step 42.

35 The step 41 changes the 1-bit mode data in the nonvolatile memory 15 so that the 1-bit mode data will represent the normal mode. A step 43 following the step 41 changes the various information data and the reference

data in the nonvolatile memory 15 so as to correspond to the normal mode. After the step 43, the program returns to the step 34.

The step 42 executes special factory-mode processes of checking and adjusting the television receiver. During the execution of the special factory-mode processes, electronic control volumes such as sound control volume and a brightness control volume in the television receiver can be varied at higher speeds than normal. A step 44 following the step 42 controls the on-screen device 16 so that a predetermined message or pattern representing the factory mode will be indicated on the CRT 17. After the step 44, the program returns to the step 34.

As shown in Fig. 4, a final stage of the production of the television receiver includes various steps such as adjustment steps 61 and 62, check steps 63 and 64, an ageing step 65, and a shipment setting step 66. These steps 61-66 are sequentially executed. In the case where the production facilities of the factory are designed so as to reset the microcomputer when each of the steps 61-66 ends, the CRT 17 and other sections of the television receiver are automatically held in the ageing mode of operation by the step 33 of Fig. 3 during loss times between the steps 61-66. Furthermore, in the case where a desired ageing process is completed by the ageing operation in the loss times, the positive ageing step 65 can be removed as shown in Fig. 5. As shown in Fig. 6, the steps 61, 62, 63, 64, and 66 use respective remote-control transmitters 131, 132, 133, 134, and 135 in place of the remote-control transmitter 122.

#### Claims

1. A television receiver comprising  
a mode setting means (1) for selectively setting either a factorycheck-mode of operation or a normal mode of operation of an adjustment section (1,5) for adjusting variable parameters of said receiving circuit such as sound volume or brightness of the television receiver having a first predetermined speed of adjustment variation, the mode setting means (1) being operatively connected to control means (2) for controlling said mode setting means (1) in response to the instruction signal of an instruction signal input means (3),  
characterized in that  
the adjustment section (1,5) is adapted to have the first speed of adjustment variation in the factorycheck-mode and to have a second predetermined speed of adjustment variation lower than said first speed of adjustment variation in the normal mode of operation.
2. The television receiver of claim 1 wherein the instruction signal input means (3) comprises a remote control device and a key input device.

#### 3. A television receiver comprising:

a receiving circuit (11) having adjustment sections for adjusting variable parameters of said receiving circuit such as sound volume or brightness of the television receiver

control means (13) for controlling the adjustment sections of the receiving circuit (11) to adjust and check the adjustment sections of the receiving circuit (11);

memory means (14,15) for storing data determining control modes of the control means comprising a nonvolatile memory (15) and a RAM (14);

input means (12) for inputting a signal for designating the control-mode determining data in the memory means to control the adjustment sections of the receiving circuit;

display means (16) for indicating information representing a designated control mode and also information representing results of adjustments by the control mode

and means (13) for enabling the display means (16) to indicate information representing the selected mode;

characterized in that

the nonvolatile memory (15) is adapted to store both factory check mode setting data and normal mode setting data for setting a factory checkmode in which speeds of adjustment variation of the adjustment sections of the television receiver (11) are set at predetermined speeds higher than corresponding speeds in said normal mode and in that

the television receiver further comprises means (13) for selectively transferring the factory checkmode setting data and the normal mode setting data from the nonvolatile memory (15) to the RAM (14).

4. The television receiver according to claim 4 further comprising means (13) for changing said normal mode to an ageing mode and means (13) for enabling said display means (16) to indicate information representing said ageing mode when said normal mode is changed to said ageing mode.
5. A television receiver according to claim 3, wherein  
said nonvolatile memory (15) is adapted to

store changeable mode data representing either a high-speed-of-adjustment-variation-mode such as said factory checkmode or a normal mode and comprising

means (13) for deciding whether or not the mode data in the nonvolatile memory represents the high-speed-of-adjustment-mode; and

means (13) for changing operation of the adjustment section between said high-speed-of-adjustment-variation-mode and said second-mode in response to a result of said deciding by said deciding means.

6. A television receiver according to claim 3,

wherein the mode data in the nonvolatile memory (15) initially represents the high-speed-of-adjustment-variation-mode and comprising

means for initially setting operation of the adjustment section into the high-speed-of-adjustment-variation-mode;

means (13) for detecting whether or not a shipment setting signal is inputted;

means (13) for changing the operation of the adjustment section from the high-speed-of-adjustment-variation-mode to said normal mode when said detecting means (13) detects that a shipment setting signal is inputted;

means (13) for changing the mode data in the nonvolatile memory (15) so as to represent the normal mode when said detecting means detects that a corresponding shipment signal is inputted;

means (13) for deciding whether or not the mode data in the nonvolatile memory (15) represents the high-speed-of-adjustment-variation-mode; and means for continuing said normal mode of the operation of the adjustment section when said deciding means (13) decides that the mode data in the nonvolatile memory (15) does not represent the high-speed-of-adjustment-variation-mode.

## **Patentansprüche**

1. Ein Fertigsehmpfänger mit einem Moduseinstellungsmittel (1) zum selektiven Einstellen entweder eines Fabrikprüfbetriebsmodus oder eines Normalbetriebsmodus eines Justie-

rungsabschnitts (1, 5) zum Justieren variabler Parameter des Empfangsschaltkreises, wie Klangvolumen oder Helligkeit, des Fernsehempfängers mit einer ersten vorbestimmten Justierungsvariationsgeschwindigkeit, wobei das Moduseinstellungsmittel (1) betreibbar mit Steuerungsmitteln (2) zum Steuern des Moduseinstellungsmittels (1) in Antwort auf das Anweisungssignal eines Anweisungssignaleingabemittels (3) verbunden ist, dadurch gekennzeichnet, daß der Justierungsabschnitt (1, 5) ausgelegt ist, eine erste Justierungsvariationsgeschwindigkeit in dem Fabrikprüfmodus aufzuweisen, und eine zweite vorbestimmte Justierungsvariationsgeschwindigkeit aufzuweisen, die geringer als die erste Justierungsvariationsgeschwindigkeit in dem Normalbetriebsmodus ist.

2. Der Fernsehempfänger von Anspruch 1,  
20 worin das Anweisungssignaleingabemittel (3) eine  
Fernsteuerungsvorrichtung und eine Tastaturein-  
gabevorrichtung umfaßt.

3. Ein Fernsehempfänger mit  
25 einem Empfangsschaltkreis (11) mit Justie-  
rungsabschnitten zum Justieren variabler Pa-  
rameter des Empfangsschaltkreises, wie  
30 Klangvolumen oder Helligkeit, des Fernseh-  
empfängers;

Steuerungsmitteln (13) zum Steuern der Ju-  
35 stierungsabschnitte des Empfangsschaltkrei-  
ses (11), um die Justierungsabschnitte des  
Empfangsschaltkreises (11) zu justieren und  
zu prüfen;

Speichermitteln (14, 15) zum Speichern von  
40 Daten, die Steuerungsmodi der Steuerungs-  
mittel bestimmen, mit einem nichtflüchtigen  
Speicher (15) und einem RAM (14);

Eingabemitteln (15) zum Eingeben eines Si-  
45 gnals zum Bezeichnen der Steuerungsmodus-  
bestimmungsdaten in den Speichermitteln, um  
die Justierungsabschnitte des Empfangs-  
schaltkreises zu steuern;

Darstellungsmitteln (16) zum Anzeigen von In-  
50 formation, die einen bezeichneten Steuerungs-  
modus darstellt, und auch Information, die Er-  
gebnisse von Justierungen durch den Steue-  
rungsmodus darstellt;

dadurch gekennzeichnet, daß

der nichtflüchtige Speicher (15) ausgelegt ist, sowohl Fabrikprüfmoduseinstellungsdaten als auch Normalmoduseinstellungsdaten zum Einstellen eines Fabrikprüfmodus zu speichern, in welchem Justierungsvariationsgeschwindigkeiten der Justierungsabschnitte des Fernsehempfängers (11) auf vorbestimmte Geschwindigkeiten eingestellt werden, die höher als entsprechende Geschwindigkeiten in dem Normalmodus sind, und dadurch, daß

der Fernsehempfänger weiter Mittel (13) zum selektiven Übertragen der Fabrikprüfmoduseinstellungsdaten und der Normalmoduseinstellungsdaten von dem nichtflüchtigen Speicher (15) zu dem RAM (14) umfaßt.

4. Der Fernsehempfänger nach Anspruch 4, welcher weitere Mittel (13) zum Ändern des Normalmodus zu einem Alterungsmodus und Mittel (13) zum Befähigen der Darstellungsmittel (16), Information anzuzeigen, die den Alterungsmodus darstellt, wenn der Normalmodus zu dem Alterungsmodus geändert wird, umfaßt.
5. Ein Fernsehempfänger nach Anspruch 3, worin der nichtflüchtige Speicher 15 ausgelegt ist, veränderliche Modusdaten, die entweder einen Hochgeschwindigkeitsjustierungsvariationsmodus, wie den Fabrikprüfmodus, oder einen Normalmodus darstellen, zu speichern, mit

Mitteln (13) zum Entscheiden, ob die Modusdaten in dem nichtflüchtigen Speicher den Hochgeschwindigkeitsjustierungsmodus darstellen oder nicht; und

Mitteln (13) zum Ändern des Betriebes des Justierungsabschnittes zwischen dem Hochgeschwindigkeitsjustierungsvariationsmodus und dem zweiten Modus in Antwort auf ein Ergebnis des Entscheidens durch die Entscheidungsmittel.

6. Ein Fernsehempfänger nach Anspruch 3,

worin die Modusdaten in dem nichtflüchtigen Speicher (15) anfangs den Hochgeschwindigkeitsjustierungsvariationsmodus darstellen, und mit

Mitteln (13) zum anfänglichen Einstellen des Betriebes des Justierungsabschnittes im dem Hochgeschwindigkeitsjustierungsvariationsmodus;

Mitteln (13) zum Detektieren, ob ein Lieferungseinstellungssignal eingegeben wird oder nicht;

Mitteln (13) zum Ändern des Betriebes des Justierungsabschnittes von einem Hochgeschwindigkeitsjustierungsvariationsmodus zu dem Normalmodus, wenn das Detektionsmittel (13) detektiert, daß ein Lieferungseinstellungssignal eingegeben wird;

Mitteln (13) zum Ändern der Modusdaten in dem nichtflüchtigen Speicher (15), um den Normalmodus darzustellen, wenn das Detektionsmittel detektiert, daß ein entsprechendes Lieferungssignal eingegeben wird;

Mitteln (13) zum Entscheiden, ob die Modusdaten in dem nichtflüchtigen Speicher (15) den Hochgeschwindigkeitsjustierungsvariationsmodus darstellen oder nicht; und Mitteln zum Fortsetzen des Normalbetriebsmodus des Justierungsabschnittes, wenn das Entscheidungsmittel (13) entscheidet, daß die Modusdaten in dem nichtflüchtigen Speicher (15) nicht den Hochgeschwindigkeitsjustierungsvariationsmodus darstellen.

### 30 Revendications

1. Récepteur de télévision comprenant:  
un moyen (1) d'établissement de mode pour établir sélectivement soit un mode de fonctionnement en contrôle d'usine, soit un mode normal de fonctionnement d'une section de réglage (1, 5) destinée à régler des paramètres variables dudit circuit de réception, tel que le volume du son ou la luminosité du récepteur de télévision, présentant une première vitesse de variation de réglage pré-déterminée, le moyen (1) d'établissement de mode étant relié fonctionnellement à un moyen de commande (2) destiné à commander ledit moyen (1) d'établissement de mode en réponse au signal d'instruction d'un moyen (3) d'entrée de signal d'instruction, caractérisé en ce que  
la section de réglage (1, 5) est adaptée pour présenter la première vitesse de variation de réglage dans le mode de contrôle d'usine et pour présenter une seconde vitesse pré-déterminée de variation de réglage inférieure à ladite première vitesse de variation de réglage dans le mode normal de fonctionnement.
2. Récepteur de télévision selon la revendication 1, dans lequel le moyen (3) d'entrée de signal d'instruction comprend un dispositif de télécommande et un dispositif d'entrée à clavier.

**3. Récepteur de télévision comprenant:**

un circuit de réception (11) comportant des sections de réglage pour régler des paramètres variables dudit circuit de réception, tel que le volume du son ou la luminosité du récepteur de télévision,  
 un moyen de commande (13) pour commander les sections de réglage du circuit de réception (11) de manière à régler et contrôler les sections de réglage du circuit de réception (11);  
 un moyen de mémorisation (14, 15) pour prendre en mémoire des données déterminant des modes de commande du moyen de commande et comprenant une mémoire non volatile (15) et une mémoire vive RAM (14);  
 un moyen d'entrée (12) pour entrer un signal destiné à désigner les données de détermination de mode de commande dans le moyen de mémorisation de manière à commander les sections de réglage du circuit de réception;  
 un moyen d'affichage (16) pour indiquer des informations représentant un mode de commande désigné et également des informations représentant des résultats de réglages effectués par le mode de commande;  
 et un moyen (13) pour activer le moyen d'affichage (16) de manière à indiquer des informations représentant le mode sélectionné;

caractérisé en ce que

la mémoire non volatile (15) est adaptée pour prendre en mémoire à la fois des données d'établissement de mode de contrôle d'usine et des données d'établissement de mode normal pour établir un mode de contrôle d'usine dans lequel les vitesses de variation de réglage des sections de réglage du récepteur de télévision (11) sont établies à des vitesses prédéterminées plus élevées que les vitesses correspondantes dans ledit mode normal et en ce que le récepteur de télévision comprend, en outre, un moyen (13) pour transférer sélectivement les données d'établissement de mode de contrôle d'usine et les données d'établissement de mode normal de la mémoire non volatile (15) à la mémoire RAM (14).

**4. Récepteur de télévision selon la revendication 3, comprenant, en outre, un moyen (13) pour modifier ledit mode normal en un mode de vieillissement et un moyen (13) pour activer ledit moyen d'affichage (16) de manière à indiquer des informations représentant ledit mode de vieillissement quand ledit mode de normal est changé en mode de vieillissement précité.**

5. Récepteur de télévision selon la revendication 3, dans lequel ladite mémoire non volatile (15) est adaptée pour prendre en mémoire des données de mode modifiable représentant soit un mode de variation de réglage à grande vitesse, tel que ledit mode de contrôle d'usine, soit un mode normal et comprenant:

un moyen (13) pour décider si oui ou non les données de mode dans la mémoire non volatile représentent le mode de réglage à grande vitesse; et  
 un moyen (13) pour changer le fonctionnement de la section de réglage entre ledit mode de variation de réglage à grande vitesse et ledit second mode en réponse au résultat de ladite décision par ledit moyen de décision.

**6. Récepteur de télévision selon la revendication 3,**

dans lequel les données de mode dans la mémoire non volatile (15) représentent initialement le mode de variation de réglage à grande vitesse;  
 un moyen pour établir initialement le fonctionnement de la section de réglage dans le mode de variation de réglage à grande vitesse;  
 un moyen (13) pour détecter si oui ou non un signal d'établissement d'expédition est entré; un moyen (13) pour changer le fonctionnement de la section de réglage en le faisant passer du mode de variation de réglage à grande vitesse audit mode normal quand ledit moyen de détection (13) détecte qu'un signal d'établissement d'expédition est entré;  
 un moyen (13) pour changer les données de mode dans la mémoire non volatile (15) de manière à représenter le mode normal quand ledit moyen de détection détecte qu'un signal d'expédition correspondant est entré;  
 un moyen (13) pour décider si oui ou non les données de mode dans la mémoire non volatile (15) représentent le mode de variation de réglage à grande vitesse; et un moyen pour continuer ledit mode normal de fonctionnement de la section de réglage quand ledit moyen de décision (13) décide que les données de mode dans la mémoire non volatile (15) ne représentent pas le mode de variation de réglage à grande vitesse.

FIG. 1

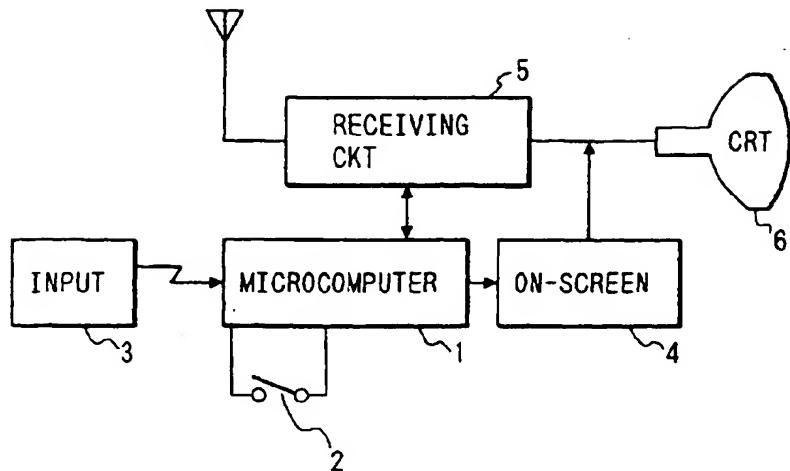


FIG. 2

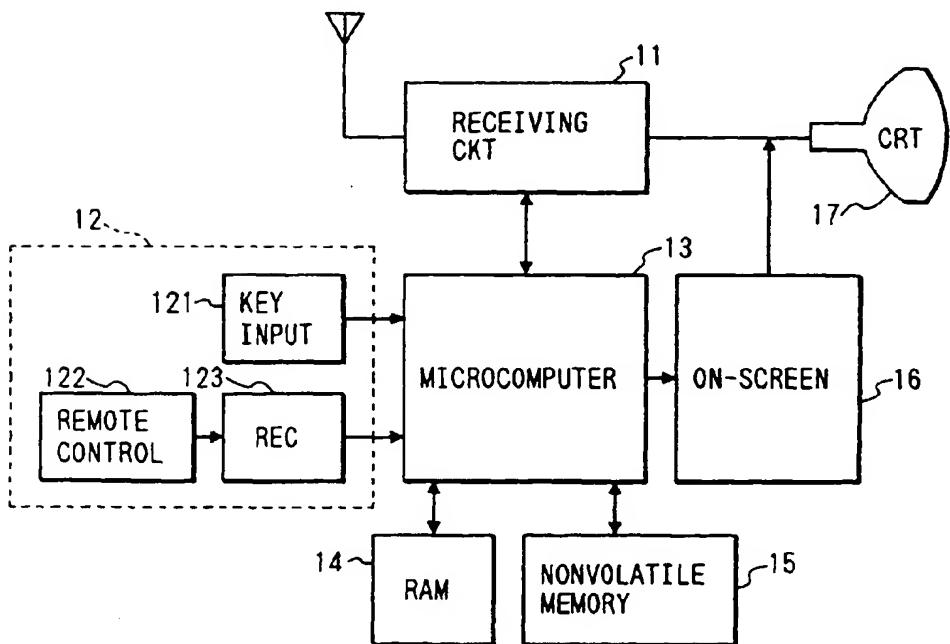


FIG. 3

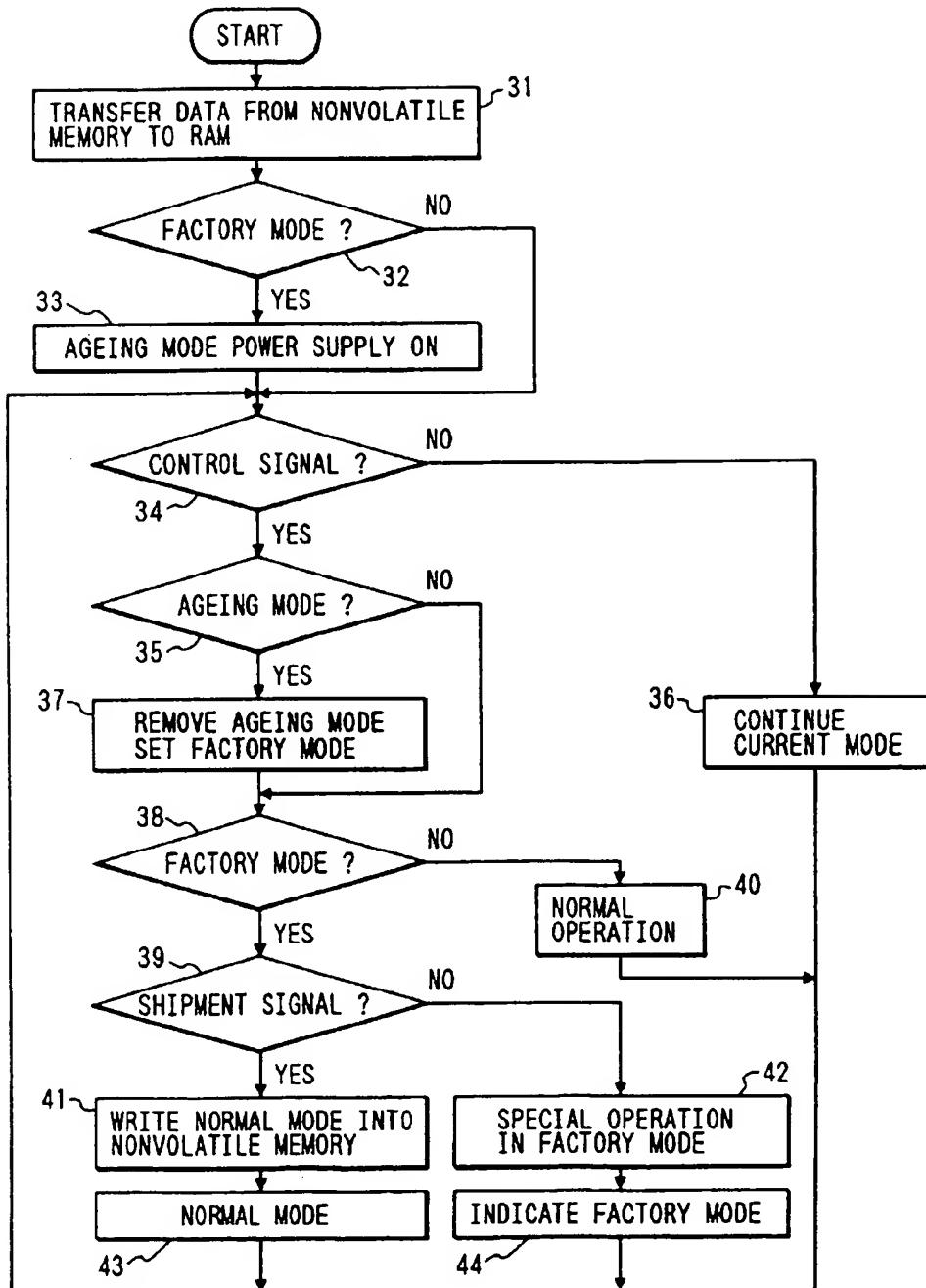


FIG. 4

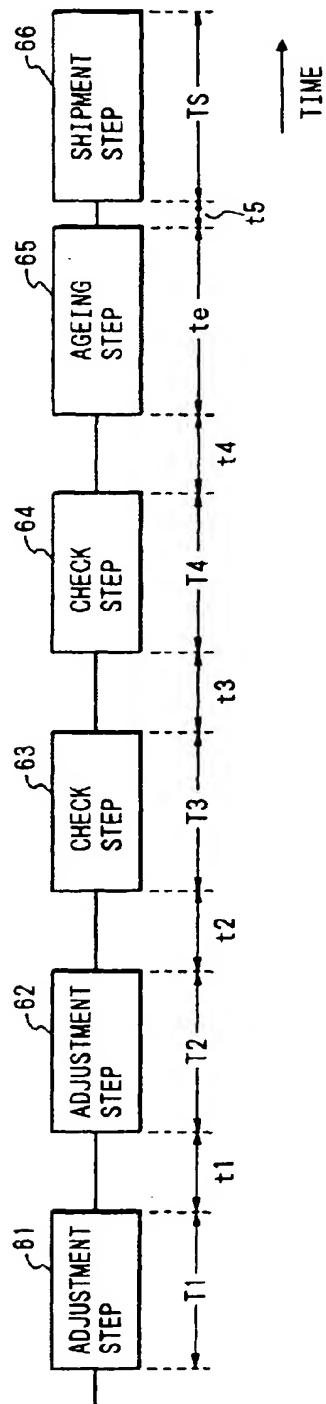


FIG. 5

